CLAIMS

What is claimed is:

1. A catalyst system for rapid startup of an autothermal reformer, the catalyst system comprising a first, upstream portion having at least a majority of a first catalyst having a first lightoff temperature, and a second, downstream portion having at least a majority of a second catalyst having a second, higher lightoff temperature, wherein the difference between the first and second lightoff temperatures is at least about 25 deg. C.

2. The catalyst system of claim 1 wherein the first and second catalyst portions are provided in a first housing and a second housing, the first housing being upstream of the second housing, the housings connected by a flow path for the passage of gas from the first housing to the second housing.

3. The catalyst system of claim 1 wherein the first and second catalyst portions are provided in a common housing, with the first catalyst being upstream of the second catalyst.

4. The catalyst system of claim 1 wherein each of the first and second catalyst portions comprises a mixture of a low-lightoff temperature catalyst and a high-lightoff temperature catalyst, the first catalyst portion comprising a higher percentage of low-lightoff temperature catalyst than the second catalyst portion.

5. The catalyst system of claim 1 wherein the difference between the first and second lightoff temperatures is at least about 50 deg. C.

6. The catalyst system of claim 5 wherein the difference between the first and second lightoff temperatures is at least about 75 deg. C.

7. The catalyst system of claim 6 wherein the difference between the first and second lightoff temperatures is at least about 100 deg. C.

8. The catalyst system of claim 7 wherein the difference between the first and second lightoff temperatures is at least about 200 deg. C.

9. A method for providing rapid startup in an autothermal reforming reaction comprising:

providing a first catalyst portion for conducting an autothermal reforming reaction, the first catalyst portion having a first lightoff temperature;

providing a second catalyst portion for conducting an autothermal reforming reaction in fluid communication with the first catalyst portion, the second catalyst portion having a second lightoff temperature that is at least 25 deg. C higher than the first lightoff temperature;

heating at least part of the first catalyst portion to the first lightoff temperature; and

flowing a mixture comprising at least air and fuel over the heated first catalyst portion to create heat by reaction of the air and fuel.

10. The method of claim 9, further comprising adding steam to the mixture of air and fuel to allow reforming of fuel over at least the first catalyst portion to produce hydrogen.

11. The method of claim 10, wherein the steam is added before the first catalyst portion has reached the first lightoff temperature.

12. The method of claim 10, wherein the steam is added after the first catalyst portion has reached the first lightoff temperature.